Canada's Financial Wellness Lab: An Architecture for Financial Wellness Research | February 2024

Canada's Financial Wellness Lab

Foreword

In 2021, the Financial Wellness Lab published its first whitepaper on financial wellness. This paper is intended to update our conclusions from 2021 and to present a plan for moving forward on this important topic. More specifically, this paper presents a conceptual model for financial wellness as a tool for articulating the Lab's research priorities.

The Lab's mandate is to translate data-driven insights into tools and practices Canadians can use to improve their financial resilience and support better financial decision-making. Our academic and industry partnerships enable us to analyze financial wellness through modelling and machine learning research. Our goal is to ensure our conclusions will enable Canadian households to enhance their financial resilience by operationalizing these insights.

The Lab resides in Western University's Faculty of Science, leveraging strengths in actuarial science, financial modelling and data science. Academic partners from the Ivey Business School, Fields Institute for Research in Mathematical Sciences, Wilfrid Laurier University, UBC Okanagan, York University and the University of Winnipeg are also part of the team. The team works closely with six industry partners – Aligned Capital Partners/CI Financial, Dayforce, Coast Capital, Environics, the National Payroll Institute and Statistics Canada – who provide invaluable data and domain expertise.

Acknowledgements

This report represents the collective thinking of the Lab's leadership and researchers noted in Section 7. In particular, the report was authored by Matt Davision (Principal Researcher), Chuck Grace (Program Director), Jaime Brenes Reyes (Research Associate) and Nicole Carleton (Research Associate).

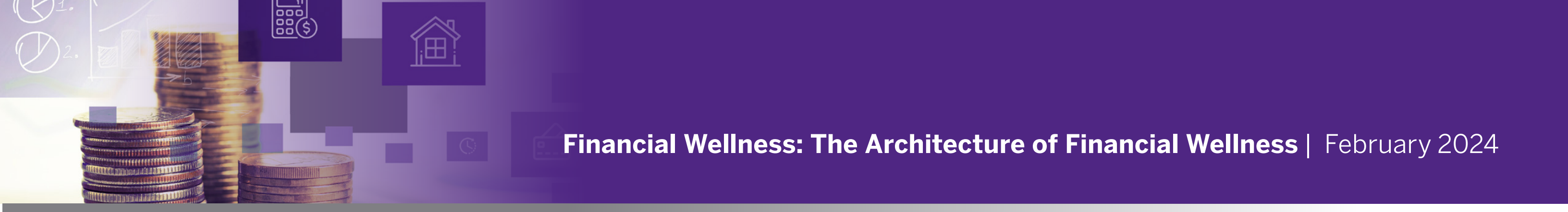


Table of Contents

Section 1: A Nation in Search of Financial Wellness 1

Section 2: An Architecture for Financial Wellness Research 3

- Financial Education 7
- Financial Resources 9
- Financial Decision Making and Behaviour 11
- Financial Resiliency 13
- Financial Values and Goals 15

Section 3: What We Know 17

Section 4: Connecting the Dots - What We Wonder: 24

Section 5: Conclusions and A Call For Action 30

Section 6: References and Sources 32

Section 7: Lab Personnel & Coordinates 37

SECTION 1: A NATION IN SEARCH OF FINANCIAL WELLNESS

A recent report by the National Payroll Institute (NPI), informed by the Lab's research on financial wellness, put it in few words: "Canadians are facing a financial storm." High interest rates, along with rising costs of living, have placed an enormous burden on working Canadians. Each day, the average Canadian worker spends 33 minutes thinking about their finances while at work – equating to $45 billion dollars in lost productivity to Canadian employers.

This statistic represents a continuation of existing trends and might be characterized as a difference of degree rather than of kind. More than ever, Canada is a nation in search of financial wellness. Employees and employers alike are looking for ways to weather the financial storm.

How Did We Get Here and Where Do We Go Now?

Since the publication of our 2021 White Paper many things have happened: inflation and interest rates – and with them mortgage rates – have dramatically climbed. Housing shortages have led to dramatically increased apartment rents. And the economy is still recovering from the COVID-19 pandemic. Our research shows that the proportion of Canadians financially struggling jumped from 31% to 37% between 2022 and 2023, with more people living paycheque-to-paycheque.

While the financial outlook for many Canadians looks worse than "normal" – more than a decade of survey results show that a substantial fraction of Canadian households has been financially struggling for a long time. Our Lab has been working to understand the root causes of these struggles and to recommend and develop tools to increase the financial resilience of Canadian families.

However, solutions often require multiple factors to be satisfied. For example accumulating a "rainyday" emergency savings account or buying home insurance are often deemed foundations of a financially resilient household. But this requires households to have the financial education to know what to do and how to do it, sufficient financial resources to afford it, and the personality traits to prioritize these expenditures over other uses of funds.

Factors such as financial resources, financial resilience, and financial education do not operate independently. We have found strong interactions between the different financial determinants. For example, having access to financial resources, well-informed and inclusive financial advice, and financial education facilitates financial resilience, especially for low and middle-income individuals. Meanwhile, some individuals with apparently ample financial resources and adequate knowledge may nonetheless make poor financial decisions, negatively impacting their level of financial resilience.

Finances can have a strong impact on the mental and physical health of individuals. The effects of financial stress on individuals significantly spill over into the country's economy, reducing productivity in the workplace.

The intersection between financial, personal and social aspects can extend farther. A stream of research in this space has focused on debt and its relationship to health. High debt-to-asset ratios have been associated with stress, depression, elevated blood pressure, and poorer general health.

High levels of unsecured debt have been linked to behaviors impacting physical health, including substance use. Financial stress can also lead to relationship strains, loneliness, and withdrawal from social networks.

To account for the complex relationship inherent in financial wellness, we propose an "architecture for financial wellness research."

Following the Lab's mandate to develop tools to strengthen the financial wellness of Canadians through data-driven research, this paper attempts to define the factors inherent in an architecture for financial wellness. Recent academic literature on financial wellness and financial wellbeing points out that, despite efforts to define it, no theory of financial wellness is yet commonly accepted. Such a theory would provide a solid framework to explore financial wellness, its ramifications, and the interconnected factors that it encompasses.

The Lab's data-driven analytical techniques enable us to identify complex relationships within large datasets, comprising millions of data points from hundreds of thousands of working Canadians. The data, much of which has been provided by the Lab's industrial partners, spans many years and contains detailed objective information on such things as income levels, savings habits and investment decisions, and demographic information such as age, marital status, number of dependents and full or part-time employment status.

SECTION 2: AN ARCHITECTURE FOR FINANCIAL WELLNESS RESEARCH

Our proposed architecture is rooted in the academic literature and from our experience studying both the self-reported attitudes and exhibited behaviors of many Canadians.

Financial Wellness in the Academic Literature

Financial wellness, as a subject of research, has gained considerable attention in recent academic literature from disparate disciplines including finance, actuarial sciences, consumer behaviour and marketing, education, and psychology. In their thorough survey, Bashir & Qureshi find that the first article on the subject was published in 1989. Over the last 10 to 15 years, financial wellness has also become a popular topic with employers, financial planners, and the public. Google queries on the topic have risen fourfold since 2004.

A bibliometric study technique suggested by Bashir & Qureshi examines academic literature by looking at elements such as the articles' title, abstract, keywords, and subject. Their study identified five major themes in the research of financial well-being: "individual skills and financial capability, socio-economic factors, financial well-being indicators and links, life stages and negative events, and work-life spillovers."

Following a similar approach, we conducted a search of "household finances" using Scopus, an abstract and citation database. Data was cleaned of keywords such as "article," "human," "study," and was restricted to peer-reviewed articles in pertinent areas of study. Data was imported into VOSviewer software for network and density visualization.

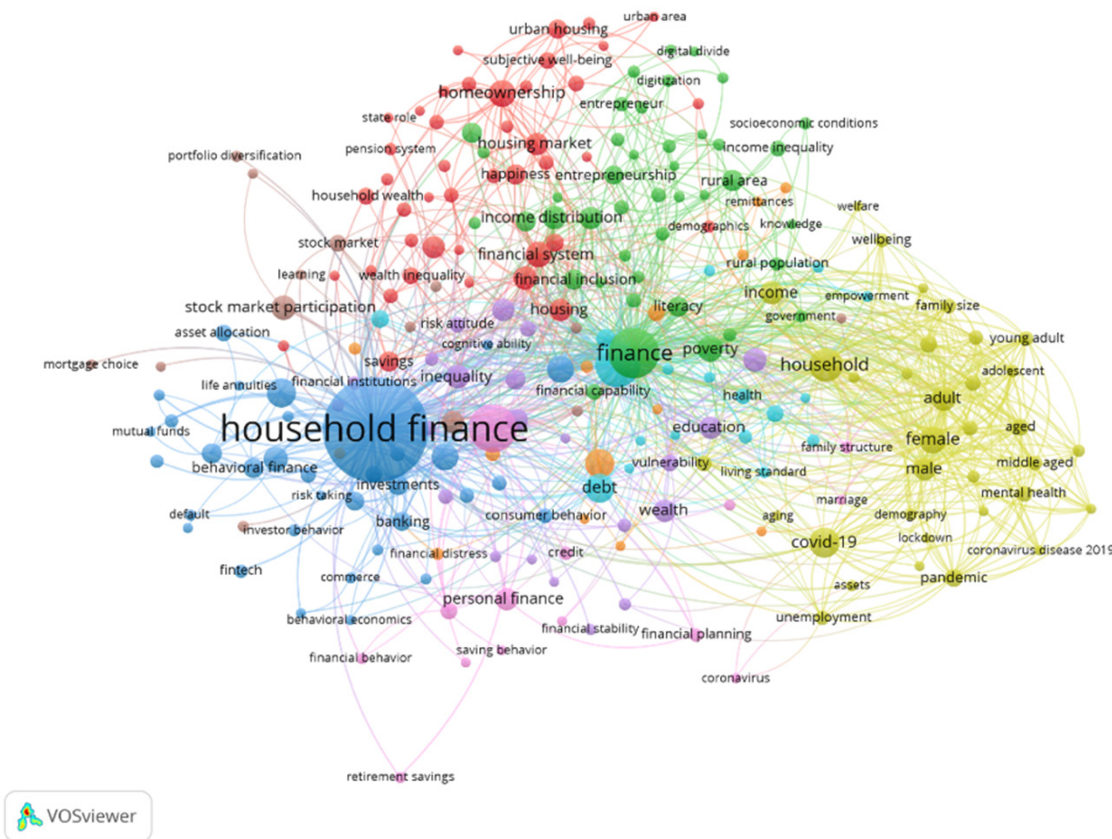
Figure 1 provides a visualization of the research on "household finance" with an emphasis on most recent academic publications published as of January 18, 2024. Wider lines denote stronger links between occurrences of the keywords. Links between articles' titles, keywords and abstract content imply neither correlation nor causation. Rather, the illustrations serve to inventory the main "household finance" research themes and their inter-relation across the literature. From the figures, we can see that the topic crosses many diverse areas of study including household finance, economics, mental health, psychology, technology and vulnerability. We think you will agree: the topic has become complicated.

Despite the increased interest, the topic has proven difficult to nail down because of the interdependent factors – some of which apply more to certain groups than to others. For instance, some scholars focus on the challenges facing those individuals who cannot gain reliable access to the financial system, others on financial education for K-12 students, and yet others on the cognitive and behavioral biases influencing investment behavior of medium to high-net-worth individuals.

In addition, time varying external circumstances drive the relative importance of various parts of the puzzle. Family debt loads that were manageable in the "low for long" interest rate environment of 2008 through 2022 have become considerably less manageable in 2023. But the same change in interest rates might ease pressures on retired Canadians relying on GIC investment income.

As interest in the topic has grown there has also been an explosion in the terms and phrases used to describe or define financial wellness. Scholars, practitioners, and policy makers all have different views and definitions. These views and definitions are not necessarily in conflict, but perhaps reflect the various disciplinary lenses and study populations of their proponents and the external environment obtained during the study.

Figure 1: Network visualization for "household finance"



An Architecture for Financial Wellness Research

A clear definition of financial wellness is crucial to a Financial Wellness Lab! It also helps us communicate to a variety of stakeholders what we plan to research and why it is important.

The Lab's mandate is to develop tools to strengthen the financial wellness of Canadians by conducting data-driven research. To do so, we propose defining the multiple factors inherent in architecture for financial wellness to focus our research efforts.

An overarching theory for financial wellness is missing and such a theory would provide a solid framework to explore financial wellness, its ramifications, and the interconnected factors that it encompasses. In this document, we do not yet presume to have created a complete theoretical framework for financial wellness. Rather, our proposed architecture represents a synthesis of a literature review and our conclusions thus far in our research journey. The architecture is a working framework to guide our research and priorities – which will change and be informed by our conversations and research conclusions.

As we continue exploration and analysis of various relevant data sources, we are also exploring the narrative behind the numbers. Each survey response tells part of a story. When put together, the story becomes a chronicle of how Canadians are in search of financial wellness: the savings and the earnings, the assets and the debt, the knowledge and the skills. Many Canadians are in an active pursuit of financial wellness in accordance with their own financial values and goals. Given the nature of our industry partners and their donated data, our research focuses on solutions that assist Canadians in their homes, in their workplace and in their schools.

Our architecture encompasses factors including values, education, resources, behaviour and decision making, resilience and needs, wants and aspirations. None of the factors exist in isolation but complement and interact with each other. For example, a high-income person has more financial resources at hand than their low-income counterpart. However, if the higher income person doesn't have or maintain an emergency savings fund, their enhanced resources may not necessarily spare them from a financial crisis after an income or other financial shock.

In the sections to follow, we break down each component of the architecture into:

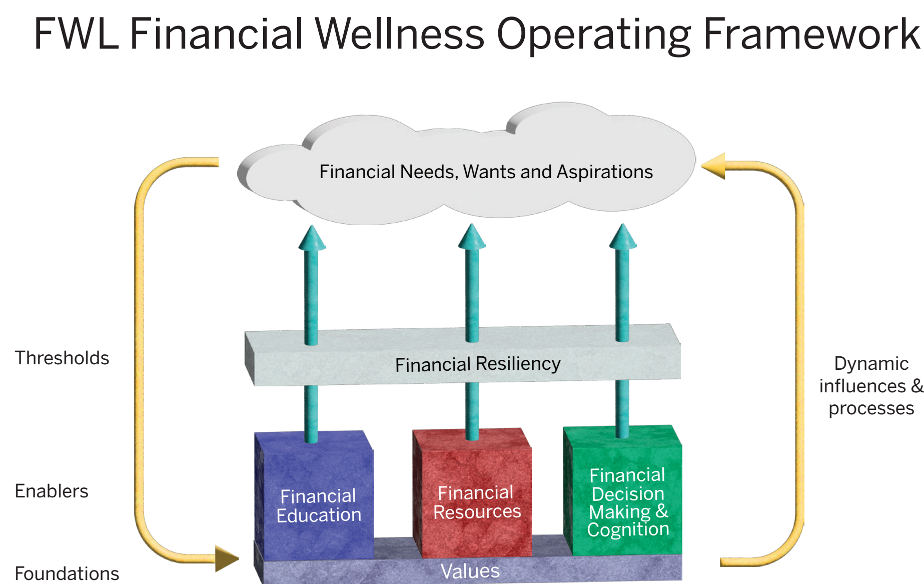
- A working definition: what we know about the financial wellness component and what we wonder.
- What each component entails and implies for financial wellness as well as whether the focus is internal or external to the household.
- Its temporal orientation: past, present or future? For example, financial education encompasses past experiences leading to the present state of someone's financial skills, perhaps oriented toward planning around future retirement or educational goals.
- A survey of existing published research on each topic including keywords in the scholarly research as well as references that can inform our research.

Our Architecture

The Webster dictionary defines wellness as the quality or state of being in good health especially as an actively sought goal. Our definition for financial wellness would be “the holistic combination of six components that, together, help households move towards good fiscal health”. There isn’t a defined boundary between the components.

In our model, there is no such thing as an equilibrium where financial wellness has been achieved and the members of a household can relax. The lines are fluid and interdependent. Progress is measured by the movement towards – but not necessarily the achievement of - needs, wants and aspirations. Those change daily. Entropy rules the day and adaptation and agility have become important skill sets.

Figure 2: Financial Wellness Operating Framework



Our six components of a Financial Wellness Architecture comprise

1. Financial Needs, Wants and Aspirations, which encompasses many of the “whys” behind an individual’s interest in financial wellness. Some needs are very practical – the need for shelter for example – while others can become esoteric and overlap with values (below). They are also very personal and differ by individual. For that reason, they serve as a caveat in the Lab’s data driven research rather than a target for a deep dive.

2. Financial Education encompasses the knowledge of money matters and finance-related skills to manage one’s financial resources. Financial education involves gaining an understanding of one’s financial needs and practicing adequate financial habits in day-to-day life.

3. Financial Resources encompass the incomes, funds, assets, credit and government programs that finance a household's activities. Those activities include the consumption of needs and wants, the accumulation of savings and the payment of debts.
4. Financial Decision Making and Behaviour encompasses the activities and practices relating to management and utilization of available financial resources. These may include the decisions made to avoid, rectify or respond to financial stressors.
5. Financial Resiliency is conceptualized as one, or perhaps more, objectively defined and measurable threshold(s) below which individuals or households could be considered financially vulnerable. The thresholds are in part defined by financial education, resources, decision making and values.
6. Financial Values and Goals speak to the fact that different people have different goals, motivations, and philosophical orientations, as well as having different sets of responsibilities. There is no one size fits all yardstick with which to measure any aspect of financial wellness or financial resilience. The Lab does not advise on values, but it is telling how many great thinkers over thousands of years have linked financial wellness to spiritual, emotional, and philosophical integrity.

In the sections to follow, we do a deeper dive into components 2 through 6, and we conclude each section with what we have discovered thus far (what we know) and our questions or hypotheses (what we wonder). The consolidation of our know-wonders represents our proposed research priorities in Section 4.

Financial Education

Among the pillars of financial wellness, education has gained considerable attention from the public and the private sector. The Financial Consumer Agency of Canada (FCAC) has designated November as "Financial Literacy Month." Many Employers offer webinars to their employees to develop skills such as budgeting & saving or selecting from investment menus for their defined contribution retirement plans.

At the Lab, we define financial education as the ability to use knowledge of money matters and finance-related skills to manage one's financial resources. Although closely related, we make a distinction between financial education and financial literacy. Financial education requires,

- A working knowledge of **financial literacy** concepts, and
- **the skills** needed to utilize that literacy in every-day life.

Financial education is literacy in action as it involves gaining an understanding of one's financial needs and practicing adequate financial habits in day-to-day life. Public and private investment are also

part of the financial education formula: investment on social capital at the workplace and schools are catalysts for financial knowledge and financial literacy, both of which are intrinsically related to financial education.

Furthermore, financial education has an important quality that distinguishes it from the other components of the architecture: it doesn't inherently rely on financial resources. For example, a high income individual may have poor financial education and weak literacy, with extreme examples of this being those whose athletic or musical talents allow them to command huge incomes while very young. At the same time, an extensive knowledge of, for instance, the creation of family trusts for tax planning is unlikely to be relevant to a low-income individual with few financial assets.

We believe financial education appropriate to the circumstances, goals, and values of the person can lead to better financial decision making, daily habits regarding spending and saving, and eventually to financial resilience. While much academic debate has focused on the dichotomy of high-income people with poor financial knowledge, we advocate for research to recognize the power of financial education in enhancing an individual's finances regardless of their current financial situation.

Keywords in the literature would include literacy, knowledge, learning, budgeting, access, planning, confidence, behaviour, ownership and participation.

From our research at the Lab, we know that income, spending, savings, and debt play an intrinsic role in financial wellness. And we know from experience that navigating each of those topics can be daunting. Cutting through the noise to get to the core issue isn't always a straight path. Solutions need to be "right" – the right answer to the right question, at the right point in time. Or the right tool or the right guidance, at the right time.

The questions we ponder about financial education (wonder), and inform our research priorities, would include:

- Is there an ideal pedagogy for financial education?
- What is the minimum viable curriculum by age group, demographic or market segment?
- Who should take the lead (elementary schools, high school, post secondary, employers, government agencies or industry supporters) by topic?
- Can fintech apps enhance financial education (e.g., keeping track of finances and daily spending and saving habits)?
- How and where does financial education intersect with financial advice and/or financial guidance?

Financial Resources

We define financial resources as the incomes, funds, assets or access to credit that finance a household's activities. Those activities include the consumption of needs and wants, the accumulation of savings and the payment of debts. Some literature refers to it as the extent to which you can comfortably meet all your current financial commitments and needs. Other research refers to the opposite – financial scarcity or a lack of resources.

We view the inclusion of financial resources within a financial wellness framework primarily from a pragmatic perspective. Even the most skilled and knowledgeable financial managers would be challenged if they did not have access to assets and cash flows. Inversely, wealthy retirees may not be financially 'well' if confronted with declining cognitive capacity and an inability to manage those resources.

Much of the 'resources' literature focuses on income as the dominant and objective measure. We hypothesize that a more holistic definition should include all sources of cash flow including financial assets, access to credit, friends and family and government benefits. Recent examples of the latter in Canada would include the recent introduction of the Canada Dental Benefit and Early Learning and Childcare system, both of which could possibly change the perception of a 'living wage.'

Resources exist generally in a present orientation – your balances as at today – but built from lived experience and representing a future potential. It has a largely internal focus based on the person's lived experiences and current situation. Within the context of our definition for financial wellness, it provides important context for resiliency and decision making. And financial education will play a role in the effective management of resources.

Keywords used by scholars include household finance, wellbeing, income, consumption, savings, portfolio, assets, retirement, borrowing, default, scarcity, poverty, inclusion, heredity, economics, balance sheet, avoidance, and depression.

Some scholars focus on resource scarcity. For example, Hamilton et al. note that,

- "Financial constraints can be characterized as a lack of resources that are required to satisfy consumers' needs or wants. At a broad level, resource scarcity reflects a real or perceived lack of capital (i.e., financial, social, cultural) or other production inputs (i.e., time) that a consumer must invest to acquire and use goods and services…the most typical experience of resource scarcity for consumers involves a perceived lack of monetary resources…"
- "…consumers cope with resource scarcity by stretching their resources further and spending them more efficiently."

- "...consumers experience resource scarcity by feeling more cognitively taxed."
- "The fact that scarcity of money attracts the consumer's attention to money suggests that it may impose a cognitive burden, reducing cognitive bandwidth and possibly hindering cognitive performance.... the cognitive demands of resource scarcity may be more severe for those on a limited budget, imposing a greater tax on mental bandwidth."
- "...when consumers are financially constrained, they may think more about opportunity costs and trade-offs."
- "In the longer-term, resource constraints change the nature of consumer spending. Not surprisingly, resource constrained consumers spend a larger proportion of their financial resources on necessities relative to discretionary purchases than less constrained consumers."

Other scholars have focused on financial resources in the context of household finance, financial management, the optimization of resource allocations or economic impact – but few link these topics to financial wellness per se. Objective measures for financial resources have predominantly focused on the thresholds for poverty as measured by income.

Statistics Canada's Financial Wellbeing Indicator considers resources, finding that roughly one-third of Canadians find it difficult to meet 'necessary expenses' such as housing, food and clothing. We hypothesize that the narrow definition of 'necessary' could be expanded to include future necessities such as saving for retirement.

Resources can be objectively measured. Common examples would include employment income, savings balances, or net worth. A credit score is an example of a financial resource with a future orientation indicating the potential for access to credit. While more difficult to measure, friends and family could also be considered a financial resource. As might pensions or government benefits.

From our research at the Lab, we know that income, savings, and debt play an intrinsic role in financial wellness. Savings and debt have proven to be predictive in our algorithms.

With respect to future research at the Lab, we wonder:

- Can we define and measure the specific variables that define Income's impact on the components of wellness?
- Are there specific saving strategies that define its impact on wellness - are an emergency account and retirement savings enough?
- The decumulation of resources after retirement appears to be a particularly complex and challenging puzzle. Is there an optimal pattern for the consumption of assets during this phase?
- What impact do liquid vs illiquid assets (home ownership) have on wellness?
- How much debt is too much? Under what circumstances can debt be used safely to increase resources? Are some forms of debt more dangerous than others?

- What role can emerging technologies play in the prudent accumulation – or decumulation – of resources? And the management of those resources?
- Government programs and policies can have a material impact on a household's access to resources. Where is government intervention most effective at facilitating wellness?

Financial Decision Making and Behaviour

Consumer financial decision-making is an interdisciplinary field, with contributions from marketing, psychology, finance and economics. Financial behaviours are the activities and practices relating to management and utilization of available financial resources. These may include actions to avoid, rectify or respond to financial stressors. The goal would be to make financial decisions comfortably, knowledgeably, and with minimal stress.

Financial decisions can have a significant impact on people's lives. We know that resource allocation decisions and anticipated utility of financial actions are important components of financial wellness. Key financial decision-making actions and practices involve saving, spending, borrowing, planning, investing, and asset accumulation.

When people perceive they have greater levels of control over outcomes and have access to financial knowledge and financial resources, they are more likely to save, budget, and to manage spending. Adequate savings are perhaps the most important predictor of financial wellbeing, as they are required for purchases, avoiding debt, making investments and helping fund retirement. Of course, adequate income is necessary to facilitate saving.

A scan of the literature identified several additional factors that can influence financial decision making. These are briefly discussed below.

Social Influences

Through social norms and pressure, the actions, thoughts and beliefs of others (e.g., family, friends, co-workers) can strongly influence financial behaviour. Rather than seeking professional advice from financial counsellors, most people rely on information from family or friends when making financial decisions.

Research indicates that family may have the strongest influence on individual financial behaviours and beliefs. Indeed, the impetus behind planning for significant events such as retirement is often based on observing parents' and older siblings' experiences with these situations.

Overconfidence

Another possible influence on financial decision-making is overconfidence, whereby people overestimate their knowledge, abilities, and judgement. Overconfidence may also lead people to stop accumulating information by overestimating the accuracy of the information they possess, and in dismissing other available information, overconfidence can result in excessive risk-taking.

Bounded Rationality

Traditional investment and savings theory assumes people collect and utilize all available information and have unlimited ability to store and process this information. However, the principle of bounded rationality considers that available information can sometimes be overwhelming, and it is generally not possible to process all information in its volume and complexity. Excessive information can complicate financial-making, and instead, people may rely on shortcuts or rules of thumb. They may also act on impulse, ignoring available information.

The implications are that simplicity and transparency of information and processes are usually best. These outcomes could be achieved by ensuring the most relevant information is salient and by narrowing the number of possibilities or options within otherwise complex choice environments. Steps such as these would be aimed at minimizing confusion, preventing immobilization or making suboptimal choices.

Framing and Choice Architecture

As suggested above, choice architecture and environment can affect financial decision-making. Research has documented the influence of preselected defaults. As an example, companies have designed pension plans to move away from opt-in to opt-out enrollment in efforts to increase plan participation. This design feature leverages people's tendencies toward inertia and maintaining the status quo.

People also make decisions based on how a situation is framed. Altering the way that choices are presented can shape behaviour without restricting choice.

Emotions and Affect

Emotional associations and affect can strongly influence decisions and actions. Marketing and advertisements are often designed to evoke emotions and specific responses from consumers. Indeed, words, images, and events can elicit immediate and automatic emotional responses.

In addition, consumers may make decisions in efforts to regulate their emotional states. A prevalent example of this is through the phenomenon of so-called 'retail therapy,' or the purchase of goods and experiences aimed at eliciting desired emotions.

Time Preferences

Decisions relating to spending and saving often depend on how people value (or discount) the future. A present bias is when people place more value on the present than the future, which can lead to greater borrowing and credit card use. Witowska refers to temporal metacognition – an ability to consciously

self-regulate the focus on past, present and future – as critical to human adaptation to change and externalities.

Unpredictable environments often result in a present focus, and deep discounting of the future has been associated with economic uncertainty. Delay of gratification may not be observed as frequently in unpredictable environments, where one cannot know whether options that are available today will be available at some point in the future.

In relation to this topic, key words appearing in the academic literature may include: Financial behavior, motivation, attitude, capability, opportunity, impulsivity, delay of gratification, conscientiousness, time orientation, locus of control, social comparison, coping (financial and proactive), behavior intention, behavior control, financial self-efficacy, emotion, cognition, decision making, behavioral finance, behavioral economics, robo-advising, bounded rationality.

As we advance our research on financial wellness and its intersection with financial behaviour and decision making, we pose the following questions:

- How do consumption and saving behaviours vary by geography, age, income, and gender?
- What are the leading factors influencing consumption and saving decisions?
- What are possible (behavioural) interventions to improve financial decision-making?
- What role does advice or guidance play in financial decision making?
- Can technological tools like fintech apps and robo-advice enhance decision making?
- How comfortably and confidently are individuals making financial decisions?

Financial Resiliency

We view financial resiliency as a threshold below which individuals or households could be considered financially vulnerable. We know that financial resilience can be objectively measured. There are specific markers that can be used to indicate financial vulnerability such as precarious income, a lack of savings or excessive debt.

Above a specified threshold, individuals or households have the potential for financial wellness. These thresholds are therefore to some degree dependent on the goals and values of the individual, although there will be a minimum threshold representing irreducible current and expected future needs. Financial resilience thresholds are informed by financial education, resources and decision making – and objective measures of minimum metrics or ratios such as a living wage, sufficient savings for retirement or debt/income ratio – or a combination of factors.

In scholarly literature, resiliency is generally referred to as the capacity inherent in the accumulation

and retention of financial resources sufficient to weather financial shocks or take advantage of opportunities. A frequently used metric to judge resiliency is the possession of 3 months of expenses, in an emergency saving account.

Keywords used by scholars when defining resiliency include capacity, savings, income, vulnerability, stress, inclusion, crisis, management, and risk.

We view resilience as a continuous flow of events – existing both in the present and the future. It requires a person to focus on daily routines (present) to prepare for future events. Financial resilience is strongly influenced by externalities such as market corrections but has an internal focus.

From our perspective, a definition of resiliency should also include:

- An ability to imagine a realistic vision of a person's future self and their goals.
- An ability to imagine possible scenarios that would pose a significant risk or opportunity.
- And a commitment to manage financial resources today in anticipation of those possible scenarios tomorrow – for example to sacrifice some spending today to save for tomorrow.

From our work at the Lab, we know that the markers should encompass income, spending, savings, and debt. We've also determined that saving can be a simple, reliable, and powerful way to build financial resilience. It is a universal strategy across age groups, genders, risk tolerances and income levels. Saving and saving often – is not only easy to prescribe but effective.

Recently, external researchers have shown links between financial resilience and a host of other factors – although the links are often identified as correlated and not necessarily causal. For example:

- Bialowolsk has shown that financial literacy plays a protective role for financial resilience. Literacy's role is not symmetrical and protects more against the loss of financial resilience than it contributes to the gain of financial resilience.
- Lusardi linked financial literacy to important financial behaviours and outcomes, including planning for retirement, financial resilience, and not carrying too much debt.
- In Australia, Sun determined that financial shocks from the pandemic hit low-income households and one-parent families with dependent children the hardest.
- In Canada, Donaldson linked financial resilience to markers such as age, employment stability, household composition, immigration, race and ethnicity, savings, debt, cost of living and social capital.

At the Lab, we have identified at least three questions that we feel should be the focus of our research in the near term:

- Can we identify a definitive list of factors that have a causal relationship with resilience, and can we quantify a minimum threshold for each?
- What role does insurance play in managing resilience?
- What role do social networks and government programs play in building resilience?

Financial Values and Goals

Different people have different goals, motivations, and philosophical orientations, as well as having different sets of responsibilities. There is no one size fits all yardstick with which to measure any aspect of financial wellness.

In the Lab, we neither make judgements about what goals people have nor about how people choose to spend their money. Wherever possible we try to let the data speak for itself, but we do have to ask the data questions, and we try to do this with as few preconceptions as possible. Some examples may show the difficulties with this approach.

“Needs vs Wants”. Savings can be generated when income is greater than expenses. Can people save more? Yes, if they cut expenses. It is commonplace to divide expenses into “needs” and “wants”. But which is which? Is an annual trip to the Caribbean a need or a want? What if your aging mom and all of your siblings live there?

Not everyone is impacted by market fluctuations in the same way. As this is being written in March 2024, the Canadian media is filled with stories of high interest rates and mortgage renewal shocks. These changes do indeed present significant challenges to many Canadians. But rising interest rates do not negatively impact all Canadians. Retired Canadians living on GIC investments might find the end of the “low for long” rate environment a positive development.

We also know that risk attitudes differ. Know Your Client forms used in our research allow us to control for this, and it is known that risk tolerances and attitudes vary, on average at least, between various demographic groups.

Individual attitudes toward, for instance saving, are often shaped in childhood and are related to one’s upbringing and lifestyle; indeed, children’s spending and savings habits, for example, may be formed by eight years of age and are associated with social class. Other research links individual differences in values to neurophysiology.

Family dynamics also play a key role in forming financially relevant decisions as outlined in Kim, Gutter & Spangler.

Goals also differ. Some people are strongly motivated to build for the next generation, either through high investment in the education of their children, or through prioritizing the ability to leave money to the next generation. Others are motivated to donate to charity to support social goals. Yet others prefer to prioritize current consumption of goods and experience. Economists model this as utility of bequest, or utility of consumption, or investment in productive assets. But how do we classify violin lessons for your 9-year-old? Consumption or investment?

Our research suggests that income does not determine satisfaction with personal finances, with some individuals classified as financially struggling while having very high incomes and others classified as financially comfortable having lower incomes.

This touches on the notion of "the good life" as discussed by philosophers and religious thinkers over the ages. The Roman philosopher-emperor Marcus Aurelius wrote "Very little is needed to make a happy life; it is all within yourself in your way of thinking" (Meditations). In 1856, Thoreau wrote in his personal journal "That man is richest whose pleasures are the cheapest". Jesus said "Where your treasure is, there your heart will be also" (Matthew 6:21 New International Version) while the words "Walk Softly upon this earth – giving what you can and taking only what you need" have been attributed to Buddha. In more modern times concern over impact of our lifestyles on the environment concern some, in the voluntary simplicity movement, while others want to invest with an "Environment Social and Governance (ESG)" lens so that their investments can be harnessed to what they view as positive social goals.

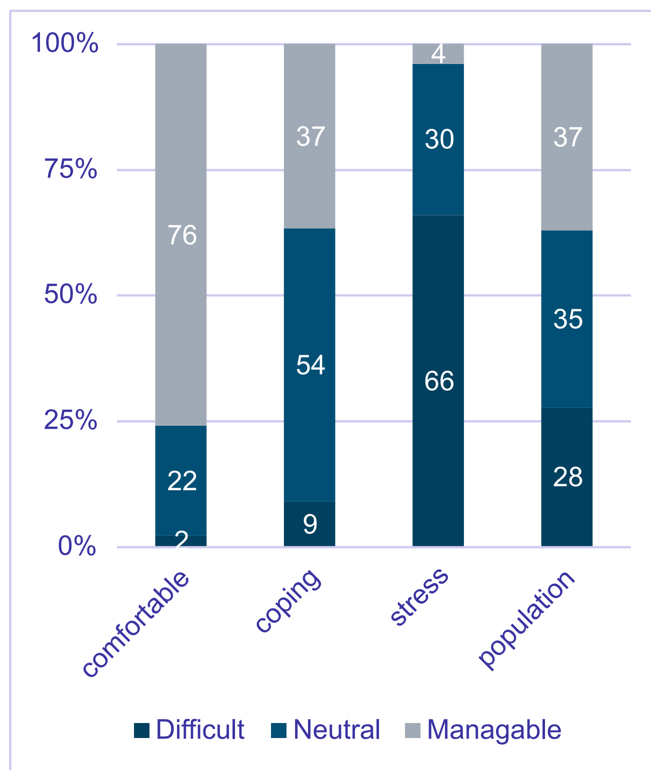
The Financial Wellness Lab does not advise on values, but it is telling how many great thinkers over thousands of years have linked financial wellness to spiritual, emotional, and philosophical integrity. While we take no position on these matters, we do agree that there is more to financial wellness than finding a way to get another 10 basis points of investment returns, or to saving money by the life hack du jour.

SECTION 3: WHAT WE KNOW

Spending

Industry and government research notes a strong link between spending patterns and the financial health of a household. Planning or budgeting are also noted in some studies, and we have included these topics here, as a subset of 'spending'. At the Lab, spending jumped out as a key determinant, but we noted that income, debt, housing and spending behaviours are all deeply entwined. Intuitively we know that income, spending and savings are integrated. The Lab analysis has noted that spending your entire paycheque, using debt to pay for essentials and finding it very difficult if your paycheque was delayed for a week represent three of the top 10 features in the clustering.

Figure 3: If your paycheque was delayed for a week, how difficult would it be to meet your current financial obligations?



All three clusters identified inflation as a key area of stress. A small minority of respondents are confident their incomes will keep pace with the cost of living. The stressed cluster is particularly worried as they are already struggling to live within their income and an increase in household costs would mean either a cut to essential spending or an increase in debt. That is not to say that the comfortable and coping clusters are indifferent to inflation. 40+% is a significant percentage of respondents who don't believe their incomes will keep pace with the cost of living. Given that the comfortable and coping are living within their means, it would appear the anticipated impact of

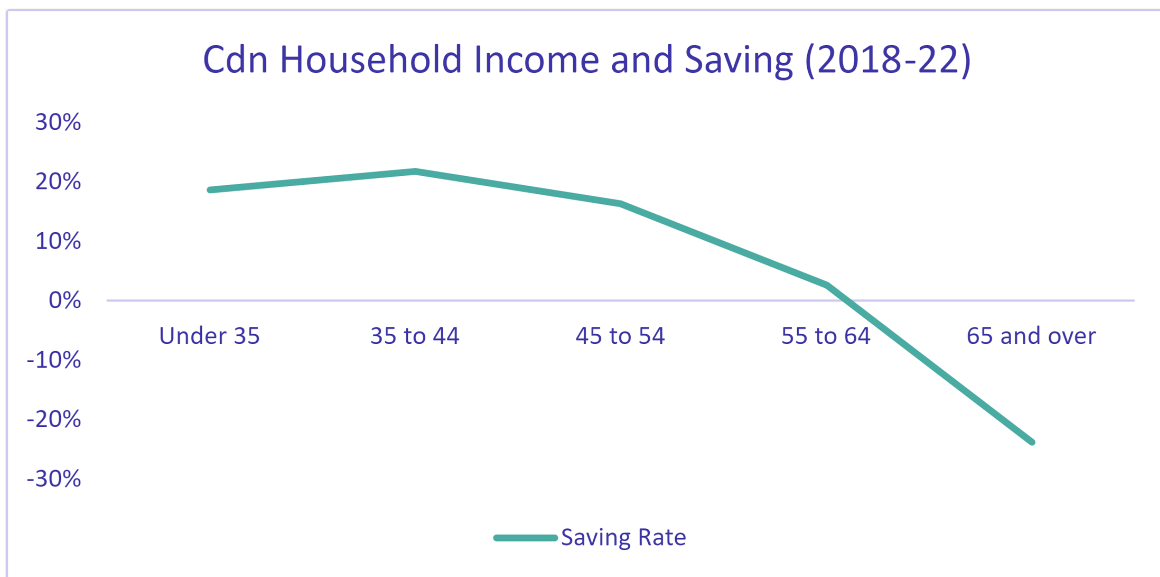
inflation would be a reduction in discretionary spending or less savings. Both the level and the volatility of income connect with how much is saved and how it is invested.

Savings

At the Lab, we use advanced data analytics such as machine learning to explore financial wellness. Of the 200+ variables used in the clustering, three of the top nine were related to savings.

In our White Paper on Savings, "The Impact of Saving on Financial Resilience", we determined that, when seeking wealth strategies with a powerful effect on financial resilience, simplicity is key. The paper determined that investors are overwhelmingly likely to be better served by a focus on savings rather than on returns. A consistent pattern of saving is a 'winning' strategy for wealth accumulation. It also noted that despite this conclusion most of the investors in the study did not appear to follow a strong saving strategy.

Figure 4: Canadian Household Savings Rates by Age Band



Employers are in a unique position to encourage systematic saving through payroll deduction. We would encourage employers to strongly support saving plans for such things as retirement but to also include plans for children's education and emergency accounts. Robust sponsorship and participation in these plans have been shown to improve employee wellness with downstream benefits to the employer in terms of reduced absence, higher productivity and stronger employee loyalty.

For consumers, the overwhelming conclusion from our research is to embrace saving and simplicity. A simple, automated savings plan into a diversified portfolio is the strongest way to achieve financial resilience. Factors such as fees, taxes, rebalancing, asset mix etc. can also be important for some investors, but it starts with saving and the accumulation of investable capital. And the first step need not be intimidating.

Debt

Like savings, all of the industry reports we've examined draw a strong inverse link between debt and the financial health of a household. And again, Statistics Canada feels strongly enough about the issue to track it on a quarterly basis.

At the Lab, our algorithms consistently note that the stressed group is largely defined by their debt – the amount of debt, how they use it, the type of debt and the stress associated with it. The gap between the comfortable and stressed clusters on this issue is dramatic. In the Lab's analysis with one of our partners, we noted that the use of payday loans is strongly associated with the stressed cluster.

The cost of housing has emerged as another key 'stressor' for the stressed and coping clusters. Amongst the Comfortable cluster, 29% are concerned about their debt load and 23% are spending more on housing than the Canada Mortgage and Housing Corporation (CMHC) recommended thresholds – and this was while interest rates were at historic lows. It should be noted that homeownership per se did not define the clusters. The majority of respondents in all three clusters are homeowners (83% of Comfortable are homeowners, 73% of Coping and 61% of Stressed). But the percentage of monthly income consumed by housing costs (including the mortgage) differs greatly. 58% of Comfortable spend less than 30% of monthly income on housing costs while 66% of Stressed are spending more than 40% on housing costs. 39% of all respondents are spending more than 40% on monthly income on housing. CMHC considers 39% to be the threshold for mortgage approval. The financially stressed group are much more likely to believe that housing costs are unaffordable and to express concern with their overall debt load.

Figure 5: My Total Monthly Housing Costs are Affordable

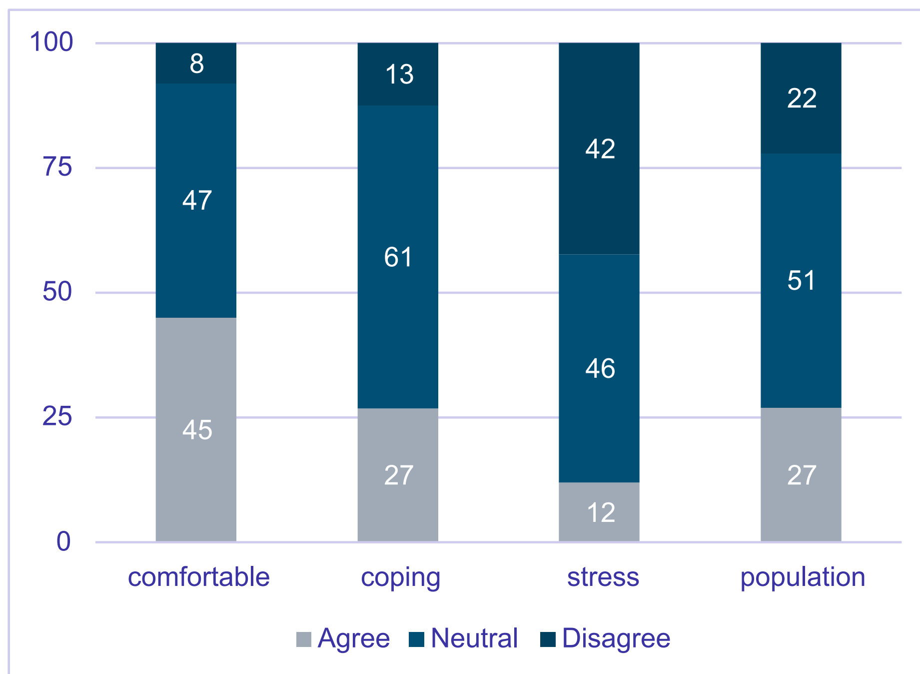
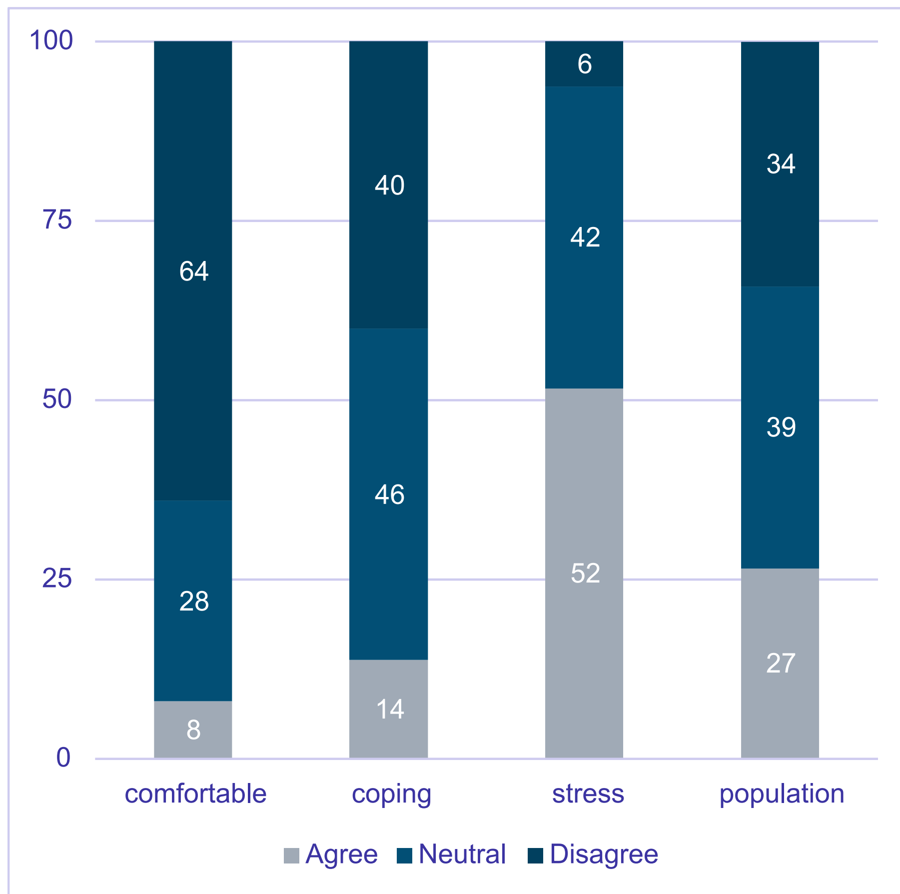


Figure 6: I Feel Overwhelmed by my Debt



Income

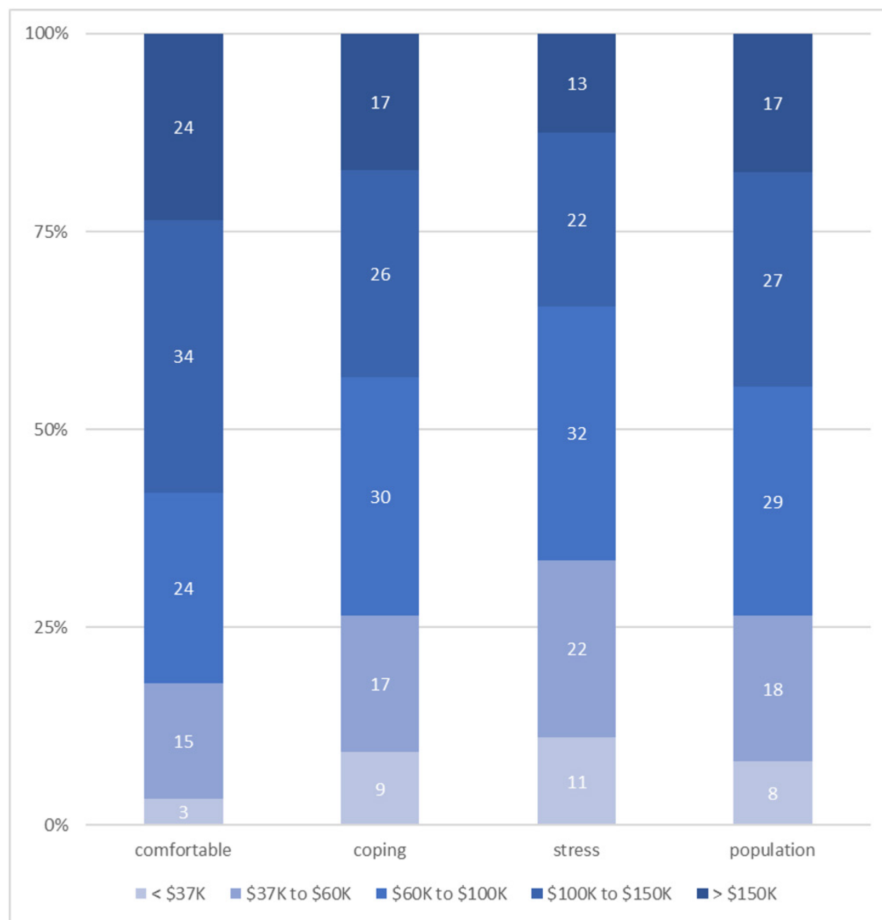
Most of the survey-based research notes a relationship between income and financial wellness but some also go on to note that income doesn't have a causal relationship.

Additional research has found that income may not have a direct effect in explaining financial satisfaction, and it appears that income is a significant determinant of financial satisfaction only when indirect effects are considered.

At the Lab, we've determined that income is one of many features of financial well-being, but income alone does not determine well-being: it matters but doesn't tell the whole story. High-income households were represented in all three clusters (see Figure 7 for an example). Thirty-five per cent of households in the 'stressed' cluster reported income of more than $100K. The stressed cluster tends to view income as the source of – and solution for – their challenges.

In one of our analyses, we determined that pay frequency also appears to play a role. To our surprise, it appears the stressed cluster is likely to be paid more frequently. However, the work in this area is preliminary and further work is required to determine the exact nature of the frequency/stress relationship.

Figure 7: Income Level Distribution Within Clusters



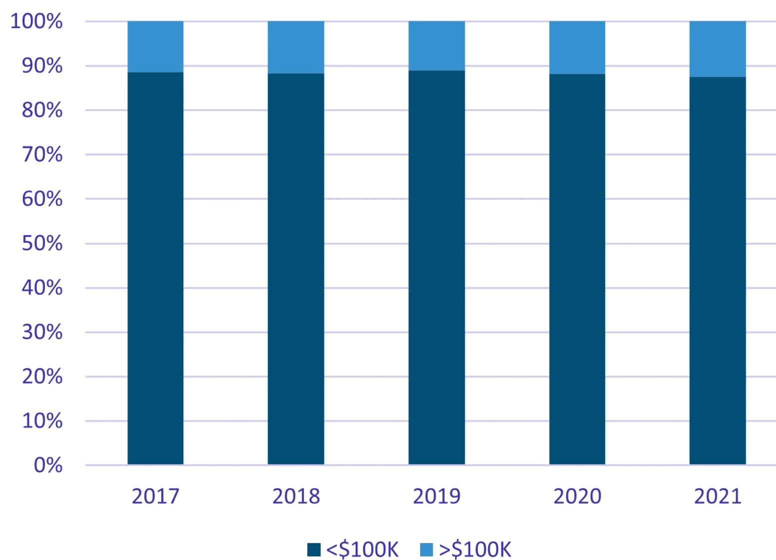
Additional nuances within the income/wellbeing discourse have been identified in the literature. While income can be used to satisfy basic material needs at lower levels of income, as income increases, material goals may also rise in tandem. Increasing material aspirations (i.e., growing 'wants') can have a negative impact on well-being and undermine the positive effect of rising income.

A prevailing theme within the literature in this vein has been that, beyond $75K (US$, 2008-09), higher income did not seem to increase happiness or reduce stress, with $75K having been identified as an average threshold for achieving emotional wellbeing and meeting basic needs.

Recent research has also identified significantly lower financial resilience scores for personal income below $20K-$39K in comparison with $60K-$79,999 (AUS$, 2015). Low income may further amplify the experience of negative life events such as divorce or serious illness. During the pandemic, resilience scores were also lower with income <$75K-$99,999 (US$, 2020-21) among individuals between the ages of 45 and 75.

By comparison, the median personal employment income in Canada was $39,500 in 2021 (Statistics Canada). Most Canadians (approximately 90%) earned below $100K per annum over the past number of years, as can be seen in Figure 8 below.

Figure 8: Canadians' Income Distribution (Statistics Canada, Table: 11-10-0240-01)



In addition to these findings, researchers have noted that when it comes to financial wellness, aspects such as money management and resource allocation (spending choices) in meeting financial goals and needs may be more important than income. Income shocks and volatility can also have wellbeing impacts, and rather than absolute income, adequacy of income in relation to expenditures and needs should be afforded consideration too.

Also, the observation that financial wellbeing tends to increase with age despite lower income in retirement seems to be suggestive of other factors contributing to wellbeing. In general, debt and liabilities decrease throughout the life course while assets increase over time. Among individuals within the baby boomer demographic, although additional income can be helpful, managing expenditures and use of credit are essential to objective and subjective wellbeing.

Much like savings and debt, income isn't a one size fits all variable. It is important to break income into categories such as salaried, hourly, variable, seasonal and gig to examine if some forms of income contribute or detract more strongly than others to financial resiliency.

Additional areas of future interest include income (in)stability and income adequacy in relation to expenditures and in meeting household needs. The Lab hopes to explore whether a 'tipping point' exists in relation to income and wellbeing, with data drawn from the Canadian context and analyzed from a wellness and resilience perspective.

Advice

Studies within the financial wellness sphere have generally ignored the impact of advice on financial wellness. Most appear to assume that 'households' make their financial decisions in a vacuum.

In a study completed in 2012 by the Center for Interuniversity Research and Analysis (CIRANO), the authors noted that households that use financial advisors had two to three times more wealth than non-advised households – after all other observable differences were controlled. Most importantly for us, they attributed the difference to savings.

Other research has gone on to conclude that behavioural coaching – especially during challenging financial situations – leads to improved investment outcomes and the attainment of financial goals (i.e., resiliency). The value of this advice also included a sense of financial well-being achieved through behavioural coaching. Studies by Vanguard have concluded that behavioural coaching adds 1.5% (of managed assets) and spending strategies add another 1.1% of the total 3.0% in total value delivered by advisors. Russell Investments estimate the value delivered by advisors as primarily derived from active portfolio rebalancing, behavioural coaching, personalized advice, product alignment and tax optimization.

Our research has concluded that advisors manage portfolios consistent with the client's suitability and that the advice is customized to their client's unique needs. We also found that advisors are systemically safe and conservative in their advice and therefore appear to mitigate exposure to undue risk.

We also turn our attention to retirement and savings regarding financial advice. The Canadian group retirement and savings industry represents approximately $2 trillion in assets under administration of which defined contribution (DC) plans have approximately a 30% share or 1.2 million account holders. At present, this segment of the industry is poorly served with respect to advice on their employer sponsored retirement savings plans. Participants in group plans are generally left to their own devices when opening a savings plan. Employers feel they do not have the expertise to advise employees on financial matters while professional advisors are hesitant to participate as group plans offer minimal compensation to advisors. As a result, the decisions made for this important component of Canadian savings plans are often less than optimal.

Inadequate advice and less than optimal decisions means that Canadians participating in these plans are often inadequately prepared for retirement. In some cases, this can result in mental and physical health issues, household stress, an erosion of workplace productivity and a reliance on government programs in retirement.

SECTION 4: CONNECTING THE DOTS - WHAT WE WONDER:

From the discussions above, several themes begin to emerge that we feel warrant research. But not all the themes need to be researched specifically by the Lab. Other scholars and academic disciplines will have unique insights and skill sets and we welcome their collaboration.

The Lab's priorities, by necessity, lie at the intersection of our core competency (financial math and actuarial modelling combined with advanced analytics), the data at our disposal and the domain expertise of our partners. From that perspective, nine research priorities emerged for us (in no particular order).

Topic	The Need for Research	Our Burning Questions
Spending	Our clustering has identified inflation as a key area of stress. The stressed cluster is particularly worried as they are already struggling to live within their income and an increase in household costs would mean either a cut to essential spending or an increase in debt. That is not to say that the comfortable and coping clusters are indifferent to inflation. 40+% is a significant percentage of respondents who don't believe their incomes will keep pace with the cost of living. Given that the comfortable and coping are living within their means, it seems the anticipated impact of inflation would be a reduction in discretionary spending or less savings.	• Can we outline and measure the specific variables that define income's impact on wellness? • What are the leading factors influencing consumption and saving decisions? • How do consumption and saving behaviors vary by geography, age, income, and gender? • How do income (in)stability and income adequacy in relation to expenditures and in meeting household needs impact resiliency? • Is there an income vs. spending 'tipping point' beyond which wellness and resilience are compromised? Or are the impacts more gradual?
Saving & Investing	Academic and industry reports draw a strong and direct link between savings rates and the financial health of a household. Several note an emergency account as particularly important to financial resilience. It makes intuitive sense that when confronted with an unexpected shortfall in cash, a reserve or cushion is invaluable. The Lab's analysis has reinforced this conclusion.	• Are there specific saving strategies that impact wellness – is an emergency account and retirement savings enough? What should people do first? • What is the role of an employer with respect to enabling savings? • "What defines the attributes of a strong saver? Can people change their savings orientation? • What role can emerging technologies play in the prudent accumulation – or decumulation – of resources and the management of those resources?

Income Resiliency	Further work is required to examine how household income contributes to financial resiliency and how the characteristics of income (level, interruption, sustainability etc.) empirically impact household behaviors with respect to savings patterns, investment trades, risk, and return. Income resiliency has a direct impact on savings patterns, but it also dictates other cash flow issues. Financial resiliency is compromised when the timing of cash inflows does not match cash outflows and inadequate financial buffers are in place.	• Can we define and measure the specific variables that define Income's impact on wellness? • Does the type of income: salaried, hourly, variable, seasonal and gig contribute or detract more strongly than others to financial resilience? • What role do social networks and government programs play in building resilience? Additional areas of future interest include income (in)stability and income adequacy in relation to expenditures and in meeting household needs. • Is there a 'tipping point' in relation to income and wellbeing? • Can we identify a definitive list of factors that have a causal relationship with resilience, and can we quantify a minimum threshold for each?
Protection and Security	Further research is required to examine how participation in employer sponsored benefits programs contributes to financial resiliency, and how these plans may be better crafted in view of the differing three different groups of Canadians. Employee benefits plans can cost employers and employees together the equivalent of 30% to 40% of cash compensation. Participation and utilization of these plans have a material impact on financial resiliency, and we will look at how benefits plans contribute to savings outcomes, the perception of risk and income resiliency.	• What role does insurance play in managing resilience? • Do employers have a particularly strong influence enabling savings?
Decumulation	A great deal of attention has been devoted to the problems of asset accumulation, where savings are key. However, for the 4.4 million Canadians in a defined contribution pension plan, the decumulation problem is also critical. These Canadians must decide how to sell assets they have accumulated over their lifetime - a problem exacerbated by different spending needs in the different phases of retirement - phases that can be fluid and unpredictable as retirees encounter health issues.	• The decumulation of resources after retirement is a particularly complex and challenging puzzle that requires consideration of health, survivorship variables as well as the traditional factors of mortality and market returns. How can we better understand and prescribe strategies for the consumption of assets during this phase? • Do employers have a particularly strong influence during decumulation?

Debt	Canadians are heavily indebted, and this remains a dominant driver of financial resilience - or lack thereof. In their 2019 study, the Financial Consumer Agency of Canada (FCAC) noted that 72% of Canadians have debt and 46% have more than one kind of debt. Student loans dominate in the younger age groups while mortgages and home equity lines of credit dominate among older demographic segments. Debt is coupled to the expense channel via fluctuating interest rates, very much a current stressor. Debt is also taken on for a variety of reasons - to cover income shortfalls, but also to invest or to acquire housing. It will be important to understand the subtle differences in debt instruments before providing constructive prescriptions to minimize their impact.	• How much debt is too much? • Under what circumstances can debt be used safely to increase resources? • Are some forms of debt more dangerous than others?
Housing	The cost of housing has emerged as another key `stressor' for the stressed and coping clusters. Sixty percent of all respondents spend more than 30% of their gross pre-tax income on housing. For the stressed cluster, 68% of the stressed cluster are spending more than 40% - the maximum recommended by the Canada Mortgage and Housing Corporation (CMHC). Housing is also related to income, in that employment opportunities are geographically dependent.	• What impact do liquid vs illiquid assets (home ownership) have on wellness? • How sensitive is financial resilience and wellness to inflation and interest rate changes?

Education	Financial literacy has been studied extensively and endorsed by government agencies, employers, and industry participants. And yet, there is little evidence that literacy rates are improving or that literacy is facilitating an improvement in well-being. Why not?	• Is there an ideal pedagogy for financial education? By age group? By delivery channel? • How do we ensure education is delivered to the right place, at the right time? • How do we reconcile the role of schools, school boards, government initiatives and industry initiatives? Who should take the lead and with what age group and curriculum? • What is the minimum viable education curriculum by age group, demographic or market segment? • Can fintech apps be used for financial education (e.g., keeping track of finances and daily spending and saving habits)? • How and where does financial education intersect with financial advice and/or financial guidance?
Decision Making	Similar to financial literacy, behavioral finance has been studied extensively and endorsed by government agencies, employers, and industry participants. And yet, there is little evidence that the topic is facilitating an improvement in well-being. Why not?	• Government programs and policies can have a material impact on a household's access to resources. Where is government intervention most effective at facilitating wellness? • What are possible (behavioral) interventions to improve financial decision-making? • What role does advice or guidance play in financial decision making? • Can technological tools like fintech apps and robo-advice enhance decision making? • How comfortably and confidently are individuals making financial decisions?

Centers of Influence

Taking the research themes a step further, we've noted that they can be organized into three broad streams based on where we feel emerging solutions could have the highest impact. Our overarching idea is to reach Canadians through these three centers of influence - in the home, in the workplace or in the school.

While each of these areas has discrete outcomes, they also build upon and reinforce each other. In this way, we can reconstruct the complexity of real-world decision-making, confident that our solutions will have a real-world impact.

In the home

Three research themes (spending, debt, and housing) appear to be household-centric where solutions with the greatest impact would be distributed directly to the public or through trusted intermediaries – such as government agencies, financial institutions, or financial advisors. Lab projects underway 'in the home' include an examination of:

- Financial resilience in the context of household finances and money management.
- Trading behaviors and the impact on portfolio returns.
- Savings patterns and their impact on wealth.
- The math behind saving and whether it matches real world observed behaviors.
- The impact of asset mix & rebalancing and its effect on wealth accumulation.
- An examination of the 'stressed' cluster within the National Payroll Week survey with the goal of identifying potential remedies to reduce stress.
- The features commonly assessed for a Know Your Client assessment, and which features predict a client's preferred risk tolerance.
- Investor behaviour with respect to co-holding and mental accounting.
- Investment decisions through time for self-directed and advised investors.

The Lab does not currently have any projects focused exclusively on debt or insurance and we would invite academics and industry to collaborate with us in these areas.

In the Workplace

Three research themes appear to be employer or workplace centric – income, saving and decumulation. Our overarching idea is to reach Canadians through two key centers of influence – their employer or the employer's financial benefits provider. Lab projects underway 'in the Workplace' include an examination of:

- How income contributes to financial resiliency and how the characteristics of income (amounts, interruptions, sustainability etc.) impact household behaviors with respect to savings patterns, the accumulation of debt and overall financial wellness.
- The withdrawal habits of retired clients in the context of longevity risk.
- The creation of a Financial Vulnerability Dictionary and its use as a diagnostic tool for centers of influence.
- Savings patterns and their impact on wealth.

Decumulation is a large, complex topic and we would invite academics and industry to collaborate with us on this topic.

In the School

Three research themes (debt, behavior and decision making) appear to be 'school' centric.

The Lab does not currently have projects focused exclusively on education, although we have a grant proposal to study K-12 aspects of Financial Education with the Fields Institute. We would invite academics and industry to collaborate with us in this area.

SECTION 5: CONCLUSIONS AND A CALL FOR ACTION

Canadians have been confronted by a cascade of challenges, from rising interest rates to growing concerns around affordability of daily essentials including housing. As we have seen, difficulties meeting necessary expenses and other financial concerns can impact workplace productivity and may give rise to physical and psychological health challenges.

To support Canadians in realizing financial wellness and achieving their financial goals despite these headwinds and other emerging challenges, the Lab has proposed an architecture for financial wellness that will inform and focus our research efforts.

The architecture is a holistic mix of components that together help households move towards robust financial health and the realization of their needs, wants and aspirations. Our architecture consists of five foundational factors.

1. *Financial resources* - the income streams, assets, credit and government programs that finance a household's activities. These activities enable consumption to meet needs and wants, the accumulation of savings, and payment of debts.
2. *Financial education* - the knowledge of money matters and the finance-related skills to manage one's financial resources.
3. *Financial decision making and behaviour* - the specific activities and practices relating to management and utilization of available resources. These may include actions to avoid or respond to financial stressors.
4. *Financial resiliency* - the thresholds below which individuals or households would be considered financially vulnerable. And the capacity to accumulate and retain adequate financial resources to weather financial shocks or to take advantage of emerging opportunities.
5. *Values and Goals* - are fundamental beliefs and principles about what one finds important in life. They determine standards of behavior for individuals to follow and can form through interaction with others.

These defining features of our architecture interact with and complement one another. We see this process unfolding in everyday situations. For example, utilizing available resources and financial knowledge, individuals engage in planning behaviours and make consumption, savings, and investment decisions that impact overall financial health. Access to adequate financial resources and inclusive financial advice can support optimal decision-making and facilitate financial resilience. In working toward this end, a key objective would be for individuals to make financial decisions comfortably, knowledgeably and with minimal stress. Ultimately, any changes in financial wellbeing are a result of these actions and have broader implications for overall wellbeing too.

Our Call to Action

Academic and industry partnerships are essential to our success. Our data-driven research techniques are dependent on high quality data. A sidewalk level interpretation of our results – critical for practical solutions - requires access to industry domain expertise. The interdependent nature of the variables means research and solutions require interdisciplinary study and scholarship. And, as we cross into values, behaviour and psychology, not all of the required insights can be objectively measured, or data driven.

We would therefore welcome queries from industry and scholars to explore opportunities for collaboration. In 2024, we are particularly interested in expanding our research into:

- Debt
- Decumulation
- Education
- Insurance and
- Decision Making

A list of the Lab's team and their coordinates is included in Section 7

SECTION 6: REFERENCES AND SOURCES

In addition to the Lab's own research, the papers noted below helped to inform our conclusions

Section 1

Bialowolski, P., Weziak-Bialowolska, D., Lee, M.T., Chen, Y., VanderWeele, T.J., and McNeely, E. (2021). The role of financial conditions for physical and mental health. Evidence from a longitudinal survey and insurance claims data. *Social Science & Medicine 281*, 1-10.

Dossey, L. (2007). Debt and health. *Explore 3*(2), 83-90.

Garcia Mata, O. and Zeron-Felix, M. (2022). A review of the theoretical foundations of financial well-being. *International Review of Economics 69*(4).

Guan, N., Guariglia, A., Moore, P., Xu, F., and Al-Janabi, H. (2022). Financial stress and depression in adults: a systematic review. *PLoS One* 17(2), 1-20.

Lusardi, A. Mitchell, O.S. (2014). The Economic Importance of Financial Literacy: Theory and Evidence. Journal of Economic Literature (52)1, 5-44.

Rafaeli, T. and Achdut, N. (2021). Financial strain and loneliness among young adults during the COVID-19 pandemic: the role of psychosocial resources. *Sustainability 13*(12).

Richardson, T., Elliott, P., and Roberts, R. (2013). The relationship between personal and unsecured debt and mental and physical health: A systematic review and meta-analysis. *Clinical Psychology Review 33*, 1148-1162.

Sweet, E., Nandi, A., Adam, E.K., and McDade, T.W. (2013). The high price of debt: household financial debt and its impact on mental and physical health. *Social Science & Medicine 91*, 94-100.

Section 2

Afek, A., Ben-Avraham, R., Davidov, A., Cohen, N.B., Yehuda, A.B., Gilboa, Y., and Nahum, M. (2021). Psychological resilience, mental health, and inhibitory control among youth and young adults under stress. *Front. Psychiatry 20*(11).

World Health Organization, WHO. (17 June 2022). Mental health. Retrieved from: https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response

Bashir, I., & Qureshi, I. H. (2023). Analysing literature on financial well-being: A bibliometric approach. *Paradigm Management Research Journal*, 1-26.

Merton (1992), Financial innovation and economic performance, Journal of Applied Corporate Finance, Vol 4, Issue 4, 12-22

National Payroll Institute. "Declaring an Emergency as a Perfect Storm of Financial Stress Rages." October 2023.

Decision Making and Behaviour

Achar, C., So, J., Agrawal, N., and Duhachek, A. (2016). What we feel and why we buy: the influence of emotions on consumer decision-making. *Current Opinion in Psychology 10*, 166-170.

Agarwal, S., Chomsisengphet, S., and Lim, C. (2017). What shapes consumer choice and financial products? A review. *The Annual Review of Financial Economics 9*, 127-46.

De Bondt, W.F.M. and Thaler, R.H. (1995). Financial decision-making in markets and firms: A behavioral perspective. In Jarrow, R. et al. (eds). *Handbooks in OR & MS 9*, 385-410.

Dolan, P., Elliott, A., Metcalfe, R., and Vlaev, I. (2012). Influencing financial behavior: from changing minds to changing contexts. *The Journal of Behavioral Finance 13*, 126-142.

Frydman, C. and Camerer, C.F. (2016). The psychology and neuroscience of financial decision making. *Trends in Cognitive Sciences 20*(9), 661-675.

Garcia, M.J.R. (2013). Financial education and behavioral finance: new insights into the role of information in financial decisions. *Journal of Economic Surveys 27*(2), 297-315.

Garcia-Mata, O. and Zeron-Felix, M. (2022). A review of the theoretical foundations of financial well-being. *International Review of Economics 69*, 145-176.

Greenberg, A.E. and Hershfield, H.E. (2019). Financial decision making. *Consumer Psychology Review 2*, 17-29.

Hamilton, R.W., Mittal, C., Shah, A., and Thompson, D.V. (2019). How financial constraints influence consumer behavior: an integrative framework. *Journal of Consumer Psychology 29*(2), 285-305.

Kim, J., Gutter, M.S., Spangler, T. (2017). Review of family financial decision making: Suggestions for future research and implications for financial education. *Journal of Financial Counseling and Planning 28*(2), 253-267.

Prawitz, A.D. and Cohart, J. (2016). Financial management competency, financial resources, locus of control, and financial wellness. *Journal of Financial Counseling and Planning 27*(2), 142-157.

Sorgente, A. and Lanz, M. (2017). Emerging adults' financial well-being: A scoping review. *Adolescent Res Rev 2*, 255-292.

Witowsha, J, Stolarski, M, Katarzyna, K, (2017), Temperamental basis of a balanced temporal perspective: A mediating role temporal metacognition, *Psychologia Whchowawcza 54*, 13-28.

Zhao, M. (2018). Choice architecture in consumer financial decisions. *Review of Behavioral Economics 5*, 417-437.

Education

Bialowolski et al. (2022). The Role of Financial Literacy for Financial Resilience in Middle-age and Older Adulthood. *International Journal of Bank Marketing, 40*(7), 1718-1748.

Bottazi and Oggero (2023). Financial Literacy and Financial Resilience: Evidence from Italy. *Journal of Financial Literacy and Wellbeing, 1*, 199-224.

Financial Consumer Agency of Canada (2021). Make Change that Counts: National Financial Literacy Strategy 2021-2026.

Lusardi, A., Messy, F. (2023). The Importance of Financial Literacy and Its Impact on Financial Wellbeing. *Journal of Financial Literacy and Wellbeing, 1*, 1-11.

OECD (2021), Digital delivery of financial education: design and practice. www.oecd.org//financial/education/digital-delivery-of-financial-education-design-andpractice.htm

Income

Anvari-Clark, J. and Anson, D. (2022). Predicting financial well-being using the financial capability perspective: the roles of financial shocks, income volatility, financial products, and savings behaviors. *Journal of Family and Economic Issues 43*, 730-743.

Baek, E. and DeVaney, S.A. (2004). Assessing the baby boomers' financial wellness using financial ratios and a subjective measure. *Family and Consumer Sciences Research Journal 32*(4), 321-348.

Barnhart, Brennan, Kimberley Beck, Wesley Benjamin, Chris Birrell, Samir Djidel, Andrew Heisz, and Eric Olson. Statistics Canada. Experimental estimates of family weekly income, update. Available at: https:// www150.statcan.gc.ca/n1/en/catalogue/75F0002M2021002. 2021.

Barnhart, Brennan, Kimberley Beck, Wesley Benjamin, Chris Birrell, Samir Djidel, Andrew Heisz, and Eric Olson. Statistics Canada. Experimental estimates of family weekly income, January 2020 to March 2021. Available at: https://www150.statcan.gc.ca/n1/en/catalogue/75F0002M2021006. 2021

Clark, R.L. and Mitchell, O.S. (2022). Americans' financial resilience during the pandemic. *Financial Planning Review 5,* 1-15.

Joo, S. and Grable, J.E. (2004). An exploratory framework of the determinants of financial satisfaction. *Journal of Family and Economic Issues 25*(1), 25-50.

Kahneman, D. and Deaton, A. (2010). High income improves evaluation of life but not emotional well-being. *Proceedings of the National Academy of Sciences of the United States of America 107*(38), 16489-16493.

Killingsworth, M.A., Kahneman, D., and Mellers, B. (2023). Income and emotional well-being: a conflict resolved. *PNAS 120*(10), 1-6.

Prawitz, A.D. and Cohart, J. (2016). Financial management competency, financial resources, locus of control, and financial wellness. *Journal of Financial Counseling and Planning 27*(2), 142-157.

Salignac, F., Marjolin, A., Reeve, R., Muir, K. (2019). Conceptualizing and measuring financial resilience: A multidimensional framework. *Social Indicators Research 145*, 17-38.

Suh, E. (2022). Can't save or won't save financial resilience and discretionary retirement saving among British adults in their thirties and forties. *Ageing & Society 42*, 2940-2967.

Vera-Toscano, E., Ateca-Amestoy, V., and Serrano-Del-Rosal, R. (2006). Building financial satisfaction. *Social Indicators Research 77*, 211-243.

Resilience

Bialowolski, P., et al. (2022). The role of financial literacy for financial resilience in middle-age and older adulthood.

Donaldson, K., et al. (2021). *The financial resilience and financial well-being of Canadians during the COVID-19 pandemic*. Statistics Canada.

Lusardi A, Streeter JL. Financial literacy and financial well-being: Evidence from the US. *Journal of Financial Literacy and Wellbeing.* 2023;1(2):169-198. doi:10.1017/flw.2023.13

Metzler, Zhou and Grace (2019). Learning About Financial Well-Being in Canada. *Quantitative Finance and Economics*, December 2019.

Sun, L.; Small, G.; Huang, Y.-H.; Ger, T.-B. Financial Shocks, Financial Stress and Financial Resilience of Australian Households during COVID-19. Sustainability 2022, 14, 3736. https://doi.org/10.3390/su14073736.

Resources

Campbell, J. Y. (2006). Household Finance. *The Journal of Finance, 61*(4).

Gomes, F., Haliassos, M., & Ramadorai, T. (2021). Household Finance. *Journal of Economic Literature*, 59(3), 919-1000.

Hamilton, R., Mittal, C., Shah, J., Thompson, E., & Griskevius, V. (2018). How Financial Constraints Influence Consumer Behavior: An Integrative Framework. *Journal of Consumer Psychology*.

Koval, A., & Hrytsyshyna, L. (2021). Features of formation of household financial resources in modern conditions. *World of Finance, 9*(1).

Statistics Canada. (2023, March 7). More Canadians are finding it difficult to meet food, shelter and other necessary expenses.

Zehra, Singh. (2023). Household finance: a systematic literature review and directions for future research. *Qualitative Research in Financial Markets*, 15(2).

Values

Brosch, T. and Sander, D. (2013). Neurocognitive mechanisms underlying value-based decision-making: from core values to economic value. *Frontiers in Human Neuroscience 7*, 1-8.

Furnham, A. (1985). Why do people save? Attitudes to, and habits of, saving money in Britain. *Journal of Applied Social Psychology 15*(4), 354-373.

Kim, J., Gutter, M.S., and Spangler, T. (2017). Review of family financial decision-making: Suggestions for future research and implications for financial education. *Journal of Financial Counselling and Planning 28*(2), 253-267.

Thompson, J.R.J.; Feng, L.; Reesor, R.M.; Grace, C. 2021. Know Your Clients' Behaviours: A Cluster Analysis of Financial Transactions. *Journal of Risk and Financial Management* 14:50. https://doi.org/10.3390/jrfm14020050

SECTION 7: LAB PERSONNEL & COORDINATES

In addition to the Lab's own research, the papers noted below helped to inform our conclusions

Name	Role	Email
Matt Davison	Principal Investigator	mdavison@uwo.ca
Chuck Grace	Program Director	cgrace@ivey.ca
Cristian Bravo Roman	Academic Collaborator	cbravoro@uwo.ca
Fab DiMuro	Academic Collaborator	f.dimuro@uwinnipeg.ca
Shu Li	Academic Collaborator	shu.li@uwo.ca
Adam Metzler	Academic Collaborator	ametzler@wlu.ca
Mark Reesor	Academic Collaborator	mreesor@wlu.ca
Kristina Sendova	Academic Collaborator	kpavlova@uwo.ca
Andrew Sarta	Academic Collaborator	andrew.sarta@yorku.ca
John Thompson	Academic Collaborator	john.thompson@ubc.ca
Poornima Vinoo	Academic Collaborator	pvinoo.phd@ivey.ca
Alireza Fazeli	Data Engineer	afazeli2@uwo.ca
Leon Feng	Data Engineer	lfeng63@uwo.ca
Yifan Li	Postdoctoral Associate	yli2763@uwo.ca
Yang Miao	Postdoctoral Associate	ymiao42@uwo.ca
Jaime Brenes Reyes	Research Associate	jbrenesr@uwo.ca
Nicole Carleton	Research Associate	nicarleto@uwo.ca

The Lab's Industry Advisory Board includes	Role	Firm
Chris Enright	President & Managing Director	Aligned Capital Partners
Eric Glass	Chief Marketing & Communications Officer	Dayforce
Maureen Young	Vice President	Coast Capital
Uschi Reeves	Senior Vice President	Environics
Peter Tzanetakis	President	National Payroll Institute